

What is claimed is:

1. An electric assisted bicycle configured so that a pedal force transmitted from a crank shaft and an output of
5 a motor are transmitted to an axle shaft, wherein

a clutch unit which can switch a lock direction in conjunction with brake operation by a cyclist is coupled to an output shaft of the motor.

10 2. The electric assisted bicycle according to claim 1, wherein

the crank shaft is coupled to the axle shaft via first transmission means, and the output shaft of the clutch unit is rigidly coupled to the axle shaft via second
15 transmission means.

3. The electric assisted bicycle according to claim 2, wherein

a one way clutch is interposed between the first
20 transmission means and the axle shaft.

4. The electric assisted bicycle according to claim 1, wherein

the output shaft of the clutch unit is rigidly
25 coupled to the axle shaft via transmission means, and the

crank shaft is coupled to the output shaft of the clutch unit.

5 5. The electric assisted bicycle according to claim 4,
wherein

a one way clutch is interposed between the crank shaft and the output shaft of the clutch unit.

10 6. The electric assisted bicycle according to claim 1,
wherein

the output shaft of the clutch unit is rigidly coupled to the axle shaft via transmission means, and the crank shaft is coupled to the axle shaft via said transmission means.

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7. The electric assisted bicycle according to claim 6,
wherein

a one way clutch is interposed between the crank shaft and the transmission means.

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8. The electric assisted bicycle according to any one of claims 1 to 7, wherein

the clutch unit comprises: an input side member to which motor torque in the normal rotational direction is
25 inputted; an output side member to which the torque is

outputted; a plurality of engaging elements each disposed between the input side member and the output side member; and a plurality of cam faces which cause each engaging element to be engaged with the input side member and the output side member in a wedge-like manner, so as to switch the lock direction of the clutch unit from the normal rotational direction to the reverse rotational direction in conjunction with the brake operation by the cyclist.

9. The electric assisted bicycle according to claim 8, wherein

the lock direction of the clutch unit is switched by holding the engaging elements of the clutch unit by a cage and applying a delay in rotation to the cage in conjunction with the brake operation by the cyclist.

10. The electric assisted bicycle according to claim 9, wherein

the engaging elements are constantly biased to the normal rotational direction with an elastic force applied to the cage.

11. The electric assisted bicycle according to claim 8, wherein

the plurality of cam faces of the clutch unit causes

the engaging elements to be engaged with the input side member and the output side member in both normal and reverse rotational directions in a wedge-like manner.

5 12. The electric assisted bicycle according to any one of claims 1 to 7, wherein

 the clutch unit is one which transmits reverse input torque from an output side to an input side when the reverse input torque from the output side is equal to, or
10 less than, a predetermined value and interrupts the transmission of torque from the output side to the input side when the reverse input torque exceeds the predetermined value.

15 13. The electric assisted bicycle according to claim 8, wherein

 the clutch unit is one which transmits reverse input torque from an output side to an input side when the reverse input torque from the output side is equal to, or
20 less than, a predetermined value and interrupts the transmission of torque from the output side to the input side when the reverse input torque exceeds the predetermined value.

25 14. The electric assisted bicycle according to claim

13, wherein

the plurality of cam faces of the clutch unit comprises first cam faces which cause the engaging elements to be engaged with the input side member and the output side member in a wedge-like manner only in the normal rotational direction, and second cam faces which cause the engaging elements to be engaged with the input side member and the output side member in a wedge-like manner in both normal and reverse rotational directions.

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15. The electric assisted bicycle according to claim 14, wherein

the second cam faces are provided with stopper portions to make a cam angle equal to, or larger than, the lock angle when a reverse input torque in the reverse rotational direction exceeds a predetermined value.

16. The electric assisted bicycle according to claim 15, wherein

the second cam faces are formed in one of the input side member and the output side member, and the other member is deformed by the engaging elements guided by the stopper portions to make the cam angle larger than the lock angle

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17. The electric assisted bicycle according to any one of claims 11, 13 to 16, wherein

in the cam face for causing the engaging element to be engaged with the input side member and the output side member in a wedge-like manner in both normal and reverse rotational directions, the angle between the lock position of the engaging element in the normal rotational direction and the lock position of the engaging element in the reverse rotational direction is set at equal to, or more than, 5 degrees